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EXAMINER

DIAMOND, ALAN D

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 05/14/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/057,223

Applicant(s)

McFARLAND, ERICK W.

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-96 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 8, 13-19, 21, 23, 25, 29, 31, 33-38, 42, 47, 50-56, 59, 63 and 65-96 is/are rejected.
- 7) ☒ Claim(s) 4, 6, 7, 9-12, 20, 22, 24, 26-28, 30, 32, 39-41, 43-46, 48, 49, 57, 58, 60-62 and 64 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: The instant specification lacks a sentence at page 1, line 1, referring to the provision application (i.e., 60/287,205 filed 04/27/2001) from which the instant application claims benefit. Appropriate correction is required.

Information Disclosure Statement

2. The information disclosure statement filed on September 25, 2002 does not fully comply with the requirements of 37 CFR 1.98 because a complete copy of the following two references has not been supplied: "Physics of Semiconductor Devices, Second Edition, S.M. Sze, copyright 1981 by John Wiley & sons, Inc" and "Clean Electricity from Photovoltaics, Series on Photoconversion of Solar Energy, Vol. 1, Mary D. archer, Robert Hill, Copyright 2001 by Imperial College Press". For each of said two references, only the title page and copyright page have been received. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. **NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b).** Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

Claim Objections

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3. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 36-97 been renumbered 35-96, respectively. Note on page 46 that there is no claim number 35. Accordingly claims 36-97 have been renumbered as 35-96.

4. Claim 68 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 68 recites "wherein the metal back contact comprising an ohmic contact". However, parent claim 65 already requires that the back metal contact is ohmic. Accordingly, claim 68 does not further limit claim 65.

5. Claims 7, 35, and 68 are objected to because of the following informalities: In claim 7, at line 3, the second occurrence of "of" should be deleted. In claim 35 at line 3, and in claim 68 at line 3, the term "comprising" should be changed to "comprises". Appropriate correction is required.

Claim Suggestions

6. In claim 31, at line 1, it is suggested that "The" be changed to "A".

Claim Rejections - 35 USC § 112

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7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 15, ~~23~~, 25, 29, 37, 38, ~~55~~, 63, and 65-96 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 67 is indefinite because "the conduction band edge" at line 5 lacks positive antecedent supporting claim 65.

Claim 69 is indefinite because "the front contact layer" at lines 2-3 lacks positive antecedent support in claim 65.

Claim 85 is indefinite because "the conduction band edge" at line 5 lacks positive antecedent supporting claim 83.

Claim 86 is indefinite because "the front contact layer" at lines 2-3 lacks positive antecedent support in claim 65.

Claim Rejections - 35 USC § 102/103

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-3, 5, 8, 14, 15, 17-19, 23, 31, 34, 35, 36, 42, 47, 50, 51, 53, 54, and 56 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Skotheim, U.S. Patent 4,442,185.

As seen in Figure 13, Skotheim '185 teaches a photoelectric device comprising a layer of n-type semiconductor (131) which reads on the instant light energy conversion layer; a highly conductive layer (134) of polymer blend; and a p-type semiconductor layer (132) which reads on the instant charge separation layer (see also col. 15, lines 33-59). It is the Examiner's position that the highly conductive layer (134), which produces an improved charge transfer characteristic between the n-type semiconductor (131) and a polymer electrolyte (133) and has a thickness of 100 to 1000 angstroms and reads on the instant conducting layer (see col. 15, lines 33-50). In other words, it is the Examiner's position that the highly conductive layer (134) inherently provides ballistic transport of charge carriers from the n-type semiconductor layer (131) to the p-type semiconductor layer (132). The contact layer to the left of n-type semiconductor layer (131) can be a 5-50 angstrom platinum layer (see col. 15, lines 60-63). The contact layer on the right side of p-type semiconductor layer (132) can be a metal (see col. 16, lines 19-29). As an alternative, the p-type semiconductor layer (132) reads on the instant light energy conversion layer, the n-type layer (131) reads on the instant charge separation layer, and the highly conductive layer (134) inherently provides ballistic transport of charge carriers from the p-type semiconductor layer (132) to the n-

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type semiconductor layer (131). Since Skotheim '185 teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed limitation that the conducting layer provides ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer would obviously have been present once Skotheim '185's photovoltaic device is provided. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

12. Claims 1-3, 5, 8, 13-19, 21, 23, 25, 31, 33-37, 42, 47, 50-54, 56, and 59 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chen, U.S. Patent 4,076,904.

Chen teaches a solid state photogalvanic device comprising a photoactive thin film (12) which read on the instant light energy conversion layer; an electrode (14); an insulating layer (16); a counterelectrode (18); and a photoactive film (20) of opposite conductivity type to that of photoactive thin film and which reads on the instant charge separation layer (see Figure 1; and col. 2, lines 7-32). It is the Examiner's position that the electrode (14) inherently provides ballistic transport of charge carriers from the photoactive thin film (12) to the photoactive thin film (20). Since Chen teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

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13. Claims 30 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skotheim, U.S. Patent 4,442,185, in view of Lindmayer et al, U.S. Patent 3,949,463.

As seen in Figure 13, Skotheim '185 teaches a photoelectric device comprising a layer of n-type semiconductor (131) which reads on the instant light energy conversion layer; a highly conductive layer (134) of polymer blend; and a p-type semiconductor layer (132) which reads on the instant charge separation layer (see also col. 15, lines 33-59). It is the Examiner's position that the highly conductive layer (134), which produces an improved charge transfer characteristic between the n-type semiconductor (131) and a polymer electrolyte (133) and has a thickness of 100 to 1000 angstroms and reads on the instant conducting layer (see col. 15, lines 33-50). In other words, it is the Examiner's position that the highly conductive layer (134) inherently provides ballistic transport of charge carriers from the n-type semiconductor layer (131) to the p-type semiconductor layer (132). The contact layer to the left of n-type semiconductor layer (131) can be a 5-50 angstrom platinum layer (see col. 15, lines 60-63). The contact layer on the right side of p-type semiconductor layer (132) can be a metal (see col. 16, lines 19-29). As an alternative, the p-type semiconductor layer (132) reads on the instant light energy conversion layer, the n-type layer (131) reads on the instant charge separation layer, and the highly conductive layer (134) inherently provides ballistic transport of charge carriers from the p-type semiconductor layer (132) to the n-type semiconductor layer (131). Skotheim '185 teaches the limitations of the instant claims other than the difference which is discussed below.

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Skotheim '185 does not specifically teach the use of an antireflection coating. Lindmayer et al teaches that the efficiency of a solar cell is limited due to reflection of useful light striking the top surface of the solar cell (see col. 1, lines 28-31). To reduce this problem of light reflection, an antireflective coating is applied to the surface through which light enters the solar cell (see col. 1, lines 31-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied an antireflective coating to the light-receiving surface of Skotheim '185's photovoltaic device so as to reduce the problem of light reflection, as taught by Lindmayer et al.

14. Claims 30 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen, U.S. Patent 4,076,904 in view of Lindmayer et al, U.S. Patent 3,949,463.

Chen teaches a solid state photogalvanic device comprising a photoactive thin film (12) which read on the instant light energy conversion layer; an electrode (14); an insulating layer (16); a counterelectrode (18); and a photoactive film (20) of opposite conductivity type to that of photoactive thin film and which reads on the instant charge separation layer (see Figure 1; and col. 2, lines 7-32). It is the Examiner's position that the electrode (14) inherently provides ballistic transport of charge carriers from the photoactive thin film (12) to the photoactive thin film (20). Chen teaches the limitations of the instant claims other than the difference which is discussed below.

Chen does not specifically teach the use of an antireflection coating. Lindmayer et al teaches that the efficiency of a solar cell is limited due to reflection of useful light striking the top surface of the solar cell (see col. 1, lines 28-31). To reduce this problem of light reflection, an antireflective coating is applied to the surface through which light

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enters the solar cell (see col. 1, lines 31-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied an antireflective coating to the light-receiving surface of Chen's device so as to reduce the problem of light reflection, as taught by Lindmayer et al.

Allowable Subject Matter

15. Claims 4, 6, 9-12, 20, 22, 24, 26-28, 30, 32, 39-41, 43-46, 48, 49, 57, 58, 60-62, and 64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claim 7 would be allowable if rewritten to overcome the objection for informalities set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patents 4,094,751, 4,637,969, and 6,451,415 and U.S. Patent Application Publications 2002/0189666 and 2003/0042846 are hereby made of record.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 703-308-0840. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703-308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

A handwritten signature in cursive script that reads "Alan Diamond".

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
May 13, 2003